

What is claimed is:

1. A method for increasing the hybridization rate of nucleic acids in a nucleic acid assay, said method comprising:
  - a) attaching probe nucleic acid molecules of known sequence to a solid support;
  - b) labeling nucleic acid target molecules with paramagnetic labels;
  - c) contacting the labeled target molecules with the solid support;
  - d) activating a magnetic field whereby the labeled molecules are attracted to the solid support;
  - e) washing the support and inverting the polarity of the magnetic field to remove any unbound or nonspecifically bound molecules; and
  - f) detecting the hybridized target nucleic acid molecules.
2. A method of claim 1 in which the solid support is selected from the group consisting of silicon, glass, and metals.
3. A method of claim 2 in which the solid support is or is coated with a metal selected from the group consisting of silver, copper, gold, platinum (II), mercury, mercury (II), thallium, cadmium (II), platinum (IV) and palladium (II).
3. A method of claim 1 in which the paramagnetic labels comprise superparamagnetic particles, having a diameter of from about 1 to about 10 nanometers.
4. A method of claim 1 in which the paramagnetic labels comprise paramagnetic porphyrins.

5. A method of claim 1 in which the paramagnetic labels are attached to the nucleic acid molecules using cleavable conjugating molecules.
6. A method of claim 1 in which the nucleic acid molecules are oligonucleotides, genomic DNA, cDNA, RNA or fragments thereof.
7. A method of claim 1 in which at least one member of a complementary pair is labeled with a fluorescent detection molecule.
8. A method for increasing the hybridization rate of nucleic acids in a nucleic acid assay, said method comprising:
- a) attaching nucleic acid target molecules to a solid support;
  - b) labeling nucleic acid molecules of known sequence with paramagnetic labels;
  - c) contacting the support with the labeled nucleic acid molecules of known sequence;
  - d) activating a magnetic field whereby the labeled molecules are attracted to the solid support;
  - e) washing the support and inverting the polarity of the magnetic field to remove any unbound or nonspecifically bound molecules; and
  - f) detecting the hybridized target nucleic acid molecules.
9. A method of claim 9 in which the solid support is selected from the group consisting of silicon, glass, and metals.
11. A method of claim 10 in which the solid support is or is coated with a metal selected from the group consisting of silver, copper, gold, platinum (II), mercury, mercury (II), thallium, cadmium (II), platinum (IV) and palladium (II).

12. A method of claim 9 in which the paramagnetic labels comprise superparamagnetic particles, having a diameter of from about 1 to about 10 nanometers.

5 13. A method of claim 9 in which the paramagnetic labels comprise paramagnetic porphyrins.

14. A method of claim 9 in which the paramagnetic labels are attached to the nucleic acid molecules using cleavable conjugating molecules.

10

15. A method of claim 9 in which the nucleic acid molecules are oligonucleotides, genomic DNA, cDNA, RNA or fragments thereof.

16. A method of claim 9 in which at least one member of a complementary pair is labeled with a fluorescent detection molecule.

15

TOP SECRET 5446660